
DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
CEGS-05106 (03/99)

Superseding
CEGS-05106 (11/98)

GUIDE SPECIFICATION FOR CONSTRUCTION

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03/99

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GUIDE SPECIFICATION FOR CONSTRUCTION

SECTION 05106

ROLLING COVER (CUSTOM FABRICATED) 03/99

NOTE: This guide specification covers the requirements for custom fabricated rolling covers installed on new or existing aircraft refueling system vaults as part of the Air Force Type III standard (78-24-28-88). This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-700 for military construction and in accordance with ER 1110-2-1201 for Civil Works construction.

PART 1 GENERAL

This specification covers the factory fabrication, assembly, testing, and shipping requirements for custom fabricated rolling covers having steel or aluminum shells as indicated in vault schedule on the vault drawings. Covers are to be field installed by other than the manufacturer on variously sized new and/or existing hydrant fueling system vaults and tanks.

1.1 REFERENCES

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification. During the reference reconciliation process, SPECSINTACT will automatically remove references from this paragraph that have been removed from the text.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA SAS-30 (1986) Aluminum Structures Construction
Manual Series - Section 1 Specifications

for Aluminum Structures

ASME INTERNATIONAL (ASME)

ASME B4.1	(1967; R 1987/1994) Preferred Limits and Fits for Cylindrical Parts
ASME B46.1	(1996) Surface Texture (Surface Roughness, Waviness, and Lay)
ASME BPV IX	(1998) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B18.2.1	(1996) Square and Hex. Nuts and Screws (Inch Series)
ANSI B18.2.2	(1987; R1993) Square and Hex. Nuts (Inch Series)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 276	(1997) Stainless Steel Bars and Shapes
ASTM E 165	(1995) Liquid Penetrant Examination
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 618	(1997) Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing
ASTM E 709	(1995) Magnetic Particle Examination

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1996) Structural Welding Code - Steel
AWS D1.2	(1990) Structural Welding Code - Aluminum

1.2 SUBMITTALS

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Indicate submittal classification in the blank space using "GA" when the submittal requires Government approval or "FIO" when the submittal is for information only.

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Data

Wheels; GA.

To include wheel manufacturer's catalogue cuts and dimensional sheets. Data shall contain a description of the item, materials of construction, and dimensions. Submittal shall include data sufficient to indicate compliance with specifications. Items pertaining to specifications shall be marked with a heavy black arrow.

SD-04 Drawings

Detail Drawings; GA.

Detail drawings for metalwork and machine work shall be submitted and approved prior to fabrication.

SD-07 Schedules

Materials Orders; FIO.

Copies of purchase orders, mill orders, shop orders and work orders for materials shall be submitted prior to the use of the materials in the work.

Materials List; FIO.

Materials list for fabricated items shall be submitted at the time of submittal of detail drawings.

Shipping Bill; FIO.

Shipping bill shall be submitted with the delivery of finished pieces to the site.

SD-08 Statements

Welding Procedures for Structural Steel; GA.

Schedules of welding procedures for structural steel shall be submitted and approved prior to commencing fabrication.

Welding of Aluminum; GA.

Schedules of welding processes for aluminum fabrications shall be submitted and approved prior to commencing fabrication.

Steel Welding Repairs; GA.

Welding repair plans for steel shall be submitted and approved prior to making repairs.

SD-13 Certificates

Qualification of Welders and Welding Operators; GA.

Certifications for welders and welding operators shall be submitted prior to commencing fabrication.

Welding of Aluminum; GA.

Certified report for aluminum welding qualification tests shall be submitted and approved prior to commencing welding.

1.3 METALWORK AND MACHINE WORK DETAIL DRAWINGS

Detail drawings for metalwork and machine work shall include catalog cuts, templates, fabrication and assembly details, and type, grade, and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings. Drawings shall include all dimensional and tolerance data for each size of vault being fabricated.

1.4 QUALIFICATION OF WELDERS AND WELDING OPERATORS

The Contractor shall certify that the welders, welding operators and tack welders who will perform structural steel welding have been qualified for the particular type of work to be done in accordance with the requirements of AWS D1.1, Section 4, prior to commencing fabrication. The certificate shall list the qualified welders by name and shall specify the code and procedures under which qualified and the date of qualification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require welders to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests will be recertified. Those not passing will be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

1.5 WORKMANSHIP

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Bolts and Cap Screws

All bolts shall be steel and shall conform to ASTM A 307, 60,000 PSI min. tensile strength, Grade A, hexagon head, and ANSI B18.2.1.

2.1.2 Nuts

Shall conform to the requirements of ANSI B18.2.2, and shall be of the same material and finish as the fasteners they are used with.

2.1.3 Washers

Flat washers shall conform to the requirements of ASTM A 276 (stainless steel)

2.1.4 Tube Steel

Structural tubing shall conform to ASTM A 618.

2.1.5 Rolling Cover Shell

Cover shell material shall be as indicated on the drawings and specified as follows:

2.1.5.1 Structural Steel

Carbon grade steel shall conform to ASTM A 36/A 36M.

2.1.5.2 Aluminum

Aluminum sheets and strips shall comply with ASTM B 209, alloy and temper best suited for the purpose.

2.2 WHEELS

Wheels shall be of the heavy duty industrial type and shall be the product of a company regularly engaged in the production of wheels. The wheels shall have solid rubber tires that are molded onto spoked or solid centers that are either cast, forged, or machined. The rubber shall have a hardness rating of 80-90 Shore A durometer. Tires shall not stretch or work loose from the metal center. The wheels shall be fitted with roller bearings and shall be pressure lubricated from a grease fitting. The wheels shall work in a temperature range of -40EF to +120EF. The entire wheel assembly shall be symmetrical and shall spin concentrically around the bearing. Metal centers shall be finished with either an epoxy paint, a powder coating, or shall be manufacture galvanized. The diameter of the carrier wheels shall be 6" and the diameter of the side wheels shall be 3". Wheels shall be similar or equal to the following:

6" Dia. x 2" wide - McMaster-Carr Cat.100, Pg. 470 No. 8368T25

3" Dia. x 1 3/8" wide - McMaster-Carr Cat.100, Pg. 470 No. 231921

2.2.1 Axles

The axle assembly shall be stainless steel and shall be eccentrically machined. A slotted adjustment cam plate shall attached to the axle by welding as indicated on the drawings. Eccentric offset shall be a minimum of 1/4 inch. Diameter, tolerance and finish of the mating axle shaft shall be coordinated with the wheel manufacturer's recommendations. All fits and tolerances shall be indicated on the shop drawings. Material, weld, and nut shall all be a 300 series stainless steel.

2.3 MATERIALS ORDERS

The Contractor shall furnish one copy of purchase orders, mill orders, shop orders and work orders for all materials and items used in the work. Where mill tests are required purchase orders shall contain the test site address and the name of the testing agency.

2.4 SHIPPING BILL

The Contractor shall furnish along with the shipment, a shipping bill or memorandum of each loose piece, assemblies, or subassemblies to the project site giving the designation mark, number shipped, and weight of each carton, box, or subassembly, the total weight, and the shippers name and phone number. Prior to shipping a copy of shipping bills shall be faxed to the site receiver as directed by the Contracting Officer.

PART 3 EXECUTION

3.1 FABRICATION

3.1.1 General

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating or warping the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

3.1.2 Dimensional Tolerances

Dimensions shall be measured by a calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by more than 1/8 inch for members over 30 feet in length.

3.1.3 Steel

Structural steel may be cut, when approved, by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1, Subsection 3.2. Where structural steel is not to be welded, chipping or grinding

will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Hand-guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

3.1.4 Aluminum

Laying out and cutting of aluminum shall be in accordance with the AA SAS-30, Section 6.

3.1.5 Bolted Connections

3.1.5.1 Bolted Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical. Holes for Bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16 inch larger than the diameter of the bolt unless otherwise approved, or as indicated on the drawings or specified below. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

3.1.5.2 Bolted Aluminum Connections

Punching, drilling, reaming and bolting for bolted aluminum connections shall conform to the requirements of AA SAS-30, Section 6.

3.2 MACHINE WORK

Tolerances, allowances and gauges for metal fits between plain, non-threaded, cylindrical parts shall conform to ASME B4.1 for the class of fit shown or required unless otherwise shown on approved detail drawings. Where fits are not shown they shall be suitable as approved. Tolerances for machine-finished surfaces designated by non-decimal dimensions shall be within 1/64 inch, unless otherwise indicated on the drawings. Sufficient machining stock shall be allowed to ensure true surfaces of solid material. Assembled parts shall be accurately machined and all like parts shall be interchangeable. All drilled holes shall be accurately located.

3.2.1 Finished Surfaces

Surface finishes indicated or specified herein shall be in accordance with ASME B46.1. Values of required roughness heights are arithmetical average deviations expressed in microinches. These values are maximum. Lesser degrees will be satisfactory unless otherwise indicated. Compliance with surface requirements shall be determined by sense of feel and visual inspection of the work compared to Roughness Comparison Specimens in accordance with the provisions of ASME B46.1. Values of roughness width and waviness height shall be consistent with the general type of finish specified by roughness height. Where the finish is not indicated or specified it shall be that which is most suitable for the particular surface, provide the class of fit required and be indicated on the detail drawings by a symbol which conforms to ASME B46.1 when machine finishing is provided. Flaws such as scratches, ridges, holes,

peaks, cracks or checks which will make the part unsuitable for the intended use will be cause for rejection.

3.2.2 Unfinished Surfaces

All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in an approved manner.

3.3 MISCELLANEOUS PROVISIONS

3.3.1 Metallic Coatings

Zinc Coatings. Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating.

3.3.2 Cleaning of Stainless Steel

Oil, paint and other foreign substances shall be removed from stainless steel surfaces after fabrication. Cleaning shall be done by vapor degreasing or by the use of cleaners of the alkaline, emulsion or solvent type.

3.4 WELDING

3.4.1 Welding of Structural Steel

a. Welding Procedures for Structural Steel

Welding procedures for structural steel shall be prequalified as described in AWS D1.1, Subsection 5.1 or shall be qualified by tests as prescribed in AWS D1.1, Section 5. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified.

For welding procedures qualified by tests, the test welding and specimen testing must be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contracting Officer. The Contractor shall submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10. The schedule shall provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Welding procedures must include filler metal, preheat, interpass temperature and stress-relief heat treatment

requirements. Each welding procedure shall be clearly identified as being prequalified or required to be qualified by tests. Welding procedures must show types and locations of welds designated or in the specifications to receive nondestructive examination.

b. Welding Process - Welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal and shall conform to the applicable provisions of AWS D1.1, Sections 1 thru 7, 9, 10 and 11. Welding shall be such as to minimize residual stresses, distortion and shrinkage.

c. Welding Technique

(1) Filler Metal

The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or shall be as shown where a specific choice of AWS specification allowables is required. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. A controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1, Subsection 4.5 to maintain low moisture of low hydrogen electrodes.

(2) Preheat and Interpass Temperature

Preheating shall be performed as required by AWS D1.1, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

d. Workmanship - Workmanship for welding shall be in accordance with AWS D1.1, Section 3 and other applicable requirements of these specifications.

(1) Preparation of Base Metal

Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1, Subsection 3.2.

(2) Temporary Welds

Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed herein for permanent work. Temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Preheating for temporary welds shall be as required by AWS D1.1 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose.

(3) Tack Welds

Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

3.4.2 Welding of Aluminum

Welding of aluminum shall conform to AA SAS-30 or AWS D1.2, Sections 1 through 7, 9 and 10. The welding process and welding operators shall be prequalified as required by AWS D1.2, Section 5 or AA SAS-30, Subsection 7.2.4 in accordance with the methods described in ASME BPV IX, Section IX. A certified report giving the results of the qualifying tests shall be furnished for approval. A complete schedule of the welding process for each aluminum fabrication to be welded shall be furnished for approval.

3.4.3 Welding Inspection

The Contractor shall maintain an approved inspection system and perform required inspections in accordance with Contract Clause CONTRACTOR INSPECTION SYSTEM. Welding shall be subject to inspection to determine conformance with the requirements of AWS D1.1, the approved welding procedures and provisions stated in other sections of these specifications.

3.4.3.1 Visual Examination

All completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1, Section 3 and Section 9, Part D. If there is doubt as to the soundness of any weld, nondestructive examination as specified below shall be done. The cost of such inspection will be borne by the Government.

3.4.3.2 Nondestructive Examination

a. Dye Penetrant Inspection

Dye penetrant inspection of welds shall conform to the applicable provisions of ASTM E 165.

b. Magnetic Particle Inspection

Magnetic particle inspection of welds shall conform to the applicable provisions of ASTM E 709.

c. Ultrasonic Testing

(1) Making, evaluating and reporting ultrasonic testing of welds shall conform to the requirements of AWS D1.1, Section 6, Part C. The ultrasonic equipment shall be capable of making a permanent record of the test indications. A record shall be made of each weld tested.

(2) Acceptability of Welds - Welds shall be unacceptable if shown to have defects prohibited by AWS D1.1, Section 6 or possess any

degree of incomplete fusion, inadequate penetration or undercutting.

3.4.4 Steel Welding Repairs

Defective welds shall be repaired in accordance with AWS D1.1, Section 5. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Costs for repairs and retesting shall be borne by the Contractor. Repair procedure shall be submitted for approval prior to doing repair.

3.5 ASSEMBLY

All parts to be assembled shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and grooves for lubrication shall be cleaned. Enclosed chambers or passages shall be examined to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected prior to installation. Pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly but care shall be taken not to overstress the threads. When a half nut is used for locking a full nut the half nut shall be placed first and followed by the full nut. Threads of all bolts, nuts and screws shall be lubricated with a lubricant before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted.

3.6 PROTECTION OF FINISHED WORK

3.6.1 Lubrication After Assembly

After assembly all wheels shall be pressure lubricated.

3.6.2 Aluminum

Aluminum in contact with structural steel in the area of the cover shell fastener angle clips shall be protected against galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint.

3.7 SHOP TESTING

3.7.1 Wheel Assembly Testing

The first wheel assembly shall be tested for correct fit and operation in the presence of the Contracting Officer unless otherwise waived in writing. The wheel shall rotate concentricly and smoothly on the bearings. The cam adjuster shall provide at least 1/8 inch of adjustment in each vertical direction. Waiving of tests will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee.

3.7.2 Assembly Tests

Each rolling cover including the shell, carrier, frame, and temporary

brackets shall be assembled in the shop to determine the correctness of the fabrication and matching of the component parts. Tolerances shall not exceed those shown on the drawings. Each cover assembly shall be closely checked to ensure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be done on a straight and level floor or platform, the frame shall be mounted on temporary supports in a level position. The carrier shall move smoothly and with minimal effort. Misalignment or poor operation, or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Assembly, testing, and disassembly work shall be performed in the presence of the Contracting Officer unless waived in writing. Two weeks notice of the first rolling cover assembly shall be given the Contracting Officer.

3.8 PREPARATION FOR SHIPPING

Before disassembly for shipment each rolling cover subassembly shall be match-mark stamped (or as otherwise approved) to facilitate correct reassembly in the field. The location of stampings shall be indicated by circling with a ring of white chalk after the shop finish has been applied or as otherwise directed. Each subassembly shall be wood crated, slatted, skid mounted, or otherwise packaged such that abrasion does not occur during shipment.

-- End of Section --